UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/309,766	05/11/1999	HIDEHIKO FUJIMURA	35.G2387	7945

5514 7590 04/17/2003

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
RAMSEY, KENNETH J	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/309,766	FUJIMURA ET AL.	
	Examiner	Art Unit	
	Kenneth J. Ramsey	2879	

-- The MAILING DATE of this communication appears on the cover she t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2003* .

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 2,5, 6, 8-13, 17, 18, and 20-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *all pending claims* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *28* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 5, 6, 8-13, 17, 18 and 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsutake et al (US 5,760,538), in view of Kato et al (5,688,708) and Dynka et al (5,697,825) and Banno et al (JP-7-296731) and Roovers (2,714785). Mitsutake et al discloses the assembly and evacuation of a surface conduction cathode type display device at column 10, lines 4-26. Note that Mitsutake et al state:

> "After assembling the envelope (airtightly sealed container), the exhaust pipe (not shown) of the envelope is connected to a vacuum pump and the envelope is then evacuated to a degree of vacuum of approximately 10-7 Torr. Thereafter, the exhaust pipe is sealed. Note that a getter film (not shown) is formed at a given location within the envelope immediately before or after sealing the exhaust pipe as means for maintaining the inside of the envelope to a given degree of vacuum. Getter film is a film obtained by vapor deposition, where a getter material typically containing Ba as a principal ingredient is heated by means of a heater or high frequency heating. The inside of the envelope is maintained to a degree of vacuum of 1X10-5 to 10-7 Torr by the absorption effect of the getter."

Thus, Mitsutake et al teaches two separate embodiments: 1) activating a getter immediately before sealing the exhaust tube, and 2) activating a getter immediately after sealing the exhaust tube. Mitsutake et al differs in this regard in that the claimed invention requires gettering prior to sealing. However, it would have been obvious to

one of ordinary skill in the art at the time of the claimed invention to activate the getter prior to sealing the exhaust tube, firstly, since Kato et al, column 4, lines 12-22 teach that gaseous contaminants produced during the exhaustion and sealing process can harm the cathodes if not removed or gettered prior to sealing the exhaust tube, and secondly, since the patent to Dynka et al teaches an extended bake out process at about 400°C (prior to sealing) during which contaminants are both evacuated and/or gettered prior to sealing.[1] Thus the sooner the getter is activated, the less chance of contamination of the active components of the device. Also, the non-evaporable getters as in Kato et al and Dynka clearly become activated prior to sealing. See Kato et al, column 3, lines 5-20 which states "During the sealing step in the fabrication of UHV FED 100, outgassing of display components produces gaseous species which are received by the surface of the low temperature getter alloy component of first non-evaporable getter material 120, thereby contaminating the surface. Then absorbed contaminants diffuse from the surface into the bulk of the particle, thereby activating, rejuvenating the surface and restoring its gettering capability. The surface continues to getter as long as the bulk of the particle is not saturated with contaminants. This activation/rejuvenation process is accomplished through heating to a low temperature

[1] Applicant challenges the examiner's use of Kato and Dynka since they allegedly do not relate to manufacturing an airtight vessel by use of an evacuation tube. However, Kato, column 4, lines 42-51, discloses that it is possible to first seal the periphery of the tube and subsequently pump out the vessel by connecting a vacuum pump to the vessel. Also, the gettering process of Dynka and Kato would remain the same whether the vessel was cleaned of contaminants and evacuated at the time of sealing the periphery of the tube or whether the vessel is cleaned and evacuated subsequently to the forming of the peripheral seal. With either choice the necessary heating of the vessel to remove absorbed gases will necessarily activate the non-evaporable getter as described by Dynka and Kato. The heating of vessel to remove absorbed gases is necessary in Mitsutake as taught by Banno. Dynka and Kato each disclose the necessity of gettering during such a vacuum bakeout step. Thus Dynka and Kato clearly relate to the process of Mitsutake for the reasons set forth in the rejection.

such as the sealing temperature. While this activation process begins at temperatures as low as 200°C , the rate of diffusion only becomes appreciable at temperatures above about 300°C ". These temperatures are each below the sealing temperature stated at column 4, lines 9-12. Also Dynka et al, column 3, lines 47-57 states, "The temperature is then increased further (e.g. 210°C – 310°C) and held for another relatively long time period to equalize temperature, outgas contaminants, and allow the internal furnace area and package to recover in vacuum. At this stage the temperature is still well below the frit flowing point [sealing temperature] but the getter begins to be activated. The temperature is then increased to a temperature at which the frit outgases a mixing agent added to make a viscous paste (e.g. 325°C – 400°C). The package is held at this temperature for several hours and the getter becomes further activated. The temperature is then increased [to sealing temperature] " (emphasis added).

Mitsutake et al does not explicitly disclosed simultaneously baking the entire airtight vessel while evacuating; however, it is routine practice to simultaneously bake the vessel while evacuating in order to thoroughly evacuate the vessel. See Dynka et al, column 9, lines 28-67. Also see Banno et al, translation, top of page 2.

Further, Mitsutake et al is unclear as to whether the exhaust tube is sealed by heating and whether or not evacuation is continued as the during the sealing of the exhaust tube. However, it is routine to heat the exhaust tube to seal it and continue the baking and pumping until the exhaust tube has been sealed since gases are released by the heating of the exhaust tube. To allow such gases to be trapped in the tube would otherwise decrease the ability of the getter to maintain cleanliness in the device. See

Roovers (2,714,785) column 1, lines 54-63. Thus, since it is important to maintain this state of vacuum exhaustion, it would have been obvious to one of ordinary skill in the art to continue the evacuating step in Mitsutake et al as modified during the sealing of the exhaust tube since such a process prevents contamination of the vessel by the gasses released upon heating to the sealing temperature.

As to claims 5 and 6, the evacuation step is clearly both prior to and during the activation of the non-evaporable getter. Also, it is standard to remove as many contaminants as possible before heating to high temperatures as taught at Dynka, column 9, lines 28-46, since the contaminants could otherwise react with heated components of the device and become more difficult to remove. As to claims 8 and 20, the use of a non-evaporable in the process of Mitsutake et al, would have been obvious to one of ordinary skill in the art since Kato et al teach the advantage of removing contaminants by both evacuation and gettering to avoid contamination of the active components prior to sealing. As to claims 10-12 and 22-24 and 26, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to include both an evaporable getter and a non evaporable getter in the process of Mitsutake et al as modified in view of the further advantages taught by Kato et al. Moreover, the evaporable getter is obviously degassed during the initial heating and evacuation of the device as are the other device components.

As to Claims 9, 21, 25 and 26, Kato, column 4, line 60 to column 5, line 14 discloses the employment of an external heating source to activate either the non-evaporable getter or a second evaporable getter subsequent to sealing. Also the

process of "activating an getter" corresponds to a degassing step since the heating component serves to desorb gases as well as to activate the getter. A step of degassing both the non-evaporable and the evaporable getter if also present before or during the early stages of baking is merely an obvious step of removing as many contaminants as possible before the components of the tube are heated to a such temperature that they react with the contaminants and to protect the sensitive components of the tube from sorbing such contaminants during the final baking and sealing as described by Kato, column 4, lines 12-24. Note that the evaporable getter is effective to getter gasses at temperatures as low as 200 degrees (Kato, column 3, lines 17-20) assuming that it has first been activated and thus serves to sorb contaminants before they are sorbed by the sensitive components of the device.

Response to Arguments

2. Applicant challenges the examiner's use of Kato and Dynka since they allegedly do not relate to manufacturing an airtight vessel by use of an evacuation tube. However, Kato, column 4, lines 42-51, discloses that it is possible to first seal the periphery of the tube and subsequently pump out the vessel by connecting a vacuum pump to the vessel. Also, the gettering process of Dynka and Kato would remain the same whether the vessel was cleaned of contaminants and evacuated at the time of sealing the periphery of the tube or whether the vessel is cleaned and evacuated subsequently to the forming of the peripheral seal. With either choice the necessary heating of the vessel to remove absorbed gases will necessarily activate the non-evaporable getter as described by Dynka and Kato. The heating of vessel to remove

absorbed gases is necessary in Mitsutake as taught by Banno. Dynka and Kato each disclose the necessity of gettering during such a vacuum bakeout step. Thus Dynka and Kato clearly relate to the process of Mitsutake for the reasons set forth in the rejection. Further, each of the cited references are directed to the process of maintaining cleanliness of the device to thus increase its life. If removing all of the contaminants by gettering was possible, the function of baking the envelope to degas the device as in Banno and baking and evacuating the exhaust tube during sealing as in Roovers would be unnecessary, however, that is not the case. It therefore would make no sense to omit the steps of Banno and Roovers in Mitsutake since without the careful removal of contaminants, the function of the getter would be quickly diminished and the life of the vessel would be shortened. Moreover, Roovers, Dynka and Kato each clealy relate to maintaining cleanliness and a high vacuum during the sealing of an a vacuum vessel which is required in the patents to Mitsutake and Banno. Note for instance that Banno, claim 2, includes the possibility of baking the exhaust tube up to the point of the sealing temperature and thus essentially teaches the process of Roovers even though Banno most certainly included a getter as was standard practice in the art at the time of applicants invention. Thus the references clearly suggest the invention as claimed without the added disclosure of applicant's specification.

Rejection Made Final

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Directions for Responses

Any formal response to this communication should be directed to examiner Kenneth Ramsey, Art Unit 2879, (703-308-2324) and either
faxed to: 703-872-9319; or mailed to: Box AF
Assistant Commissioner For Patents
Washington, D.C. 20231

Technical inquiries concerning this communication should be directed to Kenneth J. Ramsey, (703) 308-2324 (voice), (703) 746-4832 (fax).

Kenneth J. Ramsey
Primary Examiner
Art Unit 2879

kjr
April 14, 2003